AMENDMENTS TO THE DRAWINGS:

The attached sheet of drawings (labeled Figs. 1-3) replaces the original sheet of drawings (labeled as Figs. 1-2)

The drawing figures have been amended to be relabeled as Figures 1-3.

Attachment: One Replacement Sheet

REMARKS

The application has been amended and is believed to be in condition for allowance.

Claims 1-7 were examined.

New claims 8-15 are based on claims 1-7.

The drawing figures have been amended to be relabeled as Figures 1-3. Withdrawal of the drawing objection is solicited.

The specification withdrawal of the specification objection is solicited.

The claims were rejected as indefinite.

The claims have been amended to remedy the stated bases of rejection. Withdrawal of the indefiniteness rejection is solicited.

Claims 1-7 were rejected as anticipated by TAKASHIMA 4,655,732.

Claim 5 was rejected as obvious in further view of Van Liempd et al. 6,857,980 ("VAN LIEMPD").

Claim 4 was rejected as obvious in further view of SATTLER 6,599,211.

The amended and new claims are believed to be clearly patentable.

With reference to Figure 3 and the original specification disclosure, in the pushbelt driving belt according to the invention, the head part 12 of the transverse elements 1 is

extended in the axial direction towards both sides (as indicated by the two horizontal arrows) to such a degree that during operation said head part 12 comes into contact with the pulley sheaves.

That is, the upper limit 16 of an opening 17 formed by the head part 12 extends in the axial direction at least to an imaginary line 18, which extends from a lower limit 19 of the respective opening 17 formed by the body part 10 to the above-mentioned radially upper limit 16 of the respective opening in line with a contact surface 13. The axial ends of the head part 12 are preferably provided with additional contact surfaces 20 specifically intended for contact with the pulley sheaves. In particular, the additional contact surfaces 20 each lie substantially in line with one of the contact surfaces 13 of the body part 10.

The prior art does not teach such a pushbelt.

In the inventive pushbelt, owing to the presence of the second, additional contact surface 20 in the head part 12, an effective point of application P of the friction force between the transverse element and a pulley sheave is moved in the direction of the tilting line, so that a couple of forces between the friction force and the pushing force between the transverse elements decreases at the level of the tilting line 14. With a suitable choice of the radial and axial positions of the contact surfaces 13 of the body part 10 and of the additional contact

surfaces 20 of the head part 12 and of its dimensions, it can be ensured that an effective point of application P of the last-mentioned friction force in the radial direction substantially coincides with the radial position of the tilting line 14. With the measure according to the invention it is therefore possible in a relatively simple manner to ensure that a common moment of force of the forces acting upon the transverse element 1 is greatly reduced, and in certain circumstances even substantially eliminated. Of course, in this case the internal friction force between the tension element 2 and the transverse element 1 can also be taken into account.

As recited, a radial dimension of the additional contact surfaces 20 has a value in the region of 1/5 to 1/3 of the radial dimension of the contact surfaces 13 of the body part 10. The prior art does not teach to dimension such a component within this range.

Also see that in an advantageous embodiment, a radially outermost edge 21 of the head part 12 is provided with a centrally situated indentation 22 of the transverse element at least relative to an otherwise more or less arrowhead-shaped exterior of the head part 12. As a result of this, it is ensured that, if the axial ends of the head part 12 bend during operation, such bending will be directed radially outwards, so that an undesired contact between the head part 12 and the tension element 2 is advantageously avoided. The prior art does not teach this.

The invention relates to solving a problem that is highly specific for a metal belt of the present type, which problem in particular does not occur in the TAKASHIMA belt type.

The present belt type is in the art often referred to as a "pushbelt" and is known to comprise both metal transverse elements and metal tension elements in the form of a number of nested flat rings, whereby the transverse elements can move freely relative to the tension element along its circumference, as is in the application indicated on page 1, line 19 of the introductory part. This feature implies that some radial play is provided between the tension element and the transverse elements, such that the latter may tilt relative to the tension element, e.g., about the axial direction. Moreover, a contact between the tension element and the transverse elements solely takes place by means of friction. Claim 1 has been amended to make these features specific.

In this type of belt torque is transferred from one pulley to another via a stack of transverse elements pushing against one another between the two pulleys, as is indicated on specification, page 1, line 20. At the pulleys the transverse elements arrive into frictional contact with the pulley sheaves such that the pushing force between the elements can be transferred between the belt and the pulleys. The function of the tension element is not to transfer force from one pulley to

another, but rather to prevent the transverse elements in said stack from splashing apart.

The latter feature of the transverse elements pushing against one another for transferring force, requires the application of a so-called tilting line in a principal plane of the transverse element, allowing two adjacent, mutually contacting transverse elements to tilt relative to each other when negotiating a curved, i.e., pulley trajectory.

All of these features, which are also included in claim 1, separate the present invention from the so-called pullbelts, an example whereof is provided by TAKASHIMA.

In particular, the pullbelt shows a fixed relationship between the transverse elements and the tension means (see TAKASHIMA US 4,655,732 figures and col. 2, lines 36-39) in all directions, including the longitudinal direction of the tension element. This also means that there is no play provided therebetween in radial direction. In fact, the transverse elements are locked to the tension element by radially extending protrusion engaging in corresponding indentations of the tension element. The former not being composed of metal, but of a synthetic, plastic material.

In this type of belt, torque is transferred from one pulley to another via the tension element pulling between the two pulleys. At the pulleys, the pulling force in the tension element is transferred to or from the tension element via the

transverse element that arrive in frictional contact with the pulley sheaves. In the pullbelt there is thus essentially no pushing contact between the transverse elements.

All in all, a number of essential features of the (type of) belt according to the present claim 1 are not contained in the prior art primarily cited in the Office Action and vise versa.

Additionally, the problem underlying the present invention, of the transverse elements tilting relative to the tension element, does not occur in the TAKASHIMA belt, at least such problem is solved by TAKASHIMA in a manner fundamentally different to the present invention by positively locking the transverse elements in tension together. Of course this known solution cannot be applied to the present pushbelt type, which by its very nature requires the transverse elements to freely slide along the circumference of the tension element.

The Invention-problem & solution

The problem to be solved in the pushbelt is described in paragraph 2 of specification, page 2, and relates to an imbalance in three forces occurring at the frictional contact between the pulleys and the belt, i.e., the friction force between the transverse elements and the pulley sheave, the friction force between the transverse elements and the tension element, and the pushing force between the contacting elements

exerted at the tilting line, causing the transverse elements to (have a tendency) to tilt about the axial direction.

Again it should be clear that this problem does not occur in the TAKASHIMA pullbelt that does not even experience the latter two out of the three forces mentioned.

The prior art solution is to accommodate this imbalance by providing the transverse elements with a protrusion and a hole, each provided on a respective principle plane of the elements, whereby--in the belt--the protrusion of a succeeding element is provided in the hole of a preceding element. By defining a radial play between this hole and protrusion, the amount of axial tilting of the elements can be controlled, in casu limited by setting a very small protrusion-hole radial play.

The present invention, however, solves the above-mentioned problem in an alternative manner, by removing or at least reducing the said imbalance per se. The invention does so by providing an additional pulley sheave contacting surface located above the tension element of á specified size. By this measure the effective point of application of the friction force between the transverse elements and the pulley sheave is relocated in radial direction towards the tilting line, such that it is better aligned with the point of application of the pushing force between the contacting elements.

Obviousness

When taking the pullbelt cited as prior art in the Office Action against the pushbelt as claimed and leaving the above-described differences in features apart, one may, on the basis of the first appearance of a transverse element of such pullbelt, conclude that the transverse elements of the TAKASHIMA pullbelt and the invention's pushbelt are fairly similar in appearance, i.e., in their overall design. As such, one could perhaps mistakenly conclude that any teaching in relation to the pullbelt would be automatically considered by the skilled man in relation to the pushbelt and vice versa. In such reasoning, essential and determining design features of the transverse element design that make it exclusively suitable for inclusion in either the TAKASHIMA pullbelt or the invention's pushbelt, are not considered.

However, even if the presently claimed specification of the pulley sheave contacting surfaces in terms of their respective radial dimension could, as such, be taken from the TAKASHIMA drawings, this can only be done so in hindsight, since TAKASHIMA is silent on such specification and its technical background.

In this respect it is to be noted that the TAKASHIMA transverse element design includes a lower and an upper pulley contacting force to be able to withstand the lateral forces exerted by the pulleys (TAKASHIMA, col. 1, lines 48-59), because

of the relatively modest strength of the synthetic element material. Such problem is non-existent in the present pushbelt provided with transverse elements made from metal, whereof already only the lower element part provides sufficient strength to take up the pulley lateral ("clamping") forces. The upper element part being required and shaped solely for enclosing the tension element.

Moreover, generally speaking, the skilled man will strive to reduce the amount of belt mass situated radially beyond its effective running radius (i.e., the level of the tilting line in the pushbelt and that of the tension element in the pullbelt respectively), since at constant angular velocity the centrifugal force that is induced by a rotating mass increases with its radius of rotation.

Thus, at developing a pushbelt, there is no specific need to extend the surface area of the transverse element that arrives into contact with the pulleys, let alone doing so by providing it specifically with the present additional, i.e., upper pulley contacting surfaces located radially beyond the tilting line. In fact, as already mentioned in the previous paragraph, the skilled man would in fact actually be deterred from modifying the known pushbelt transverse element design according to the TAKASHIMA drawing, because such would add mass to a radially outer part thereof, which in turn increases the radially outwardly oriented centripetal force on the element that

is to be counteracted by the tension element, which thus increases the tensile force in the tension element ultimately reducing the service life of the pushbelt as a whole.

Accordingly, in the absence of a convincing incentive for doing so, the skilled man would not consider applying the TAKASHIMA transverse element design also in the present pushbelt.

From the above, it is believed clear that the claims and all novel and non-obvious. Allowance of all the claims is solicited.

Should there be any matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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REL/mjr

APPENDIX:

The Appendix includes the following item(s):

- a Replacement Sheet labeling the three Figures of the drawings (FIGS. 1-3)